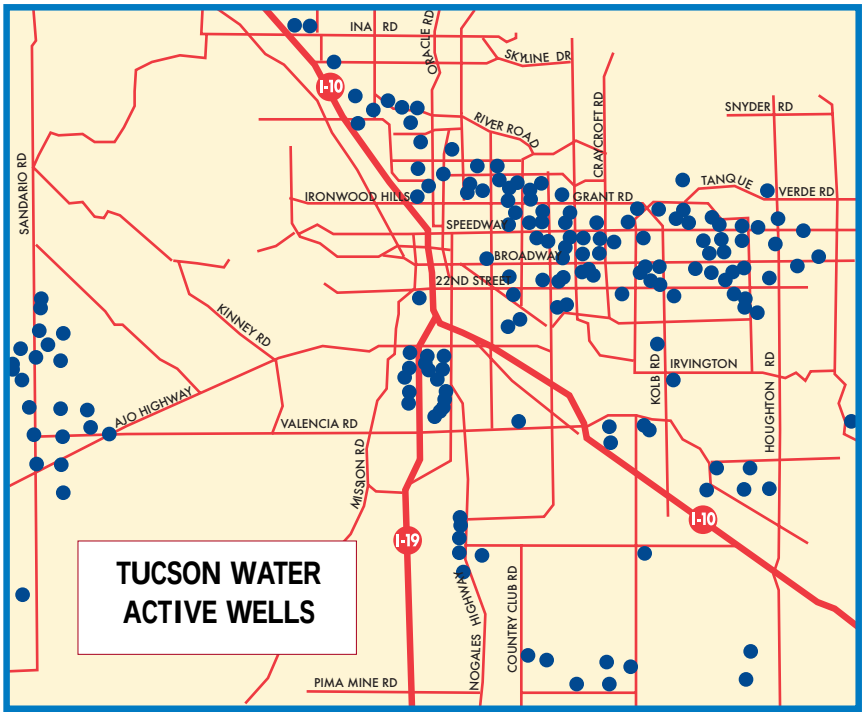
TUCSON WATER

1999 ANNUAL WATER QUALITY REPORT

WATER TREATMENT/QUALITY DIVISION

Tucson Water is pleased to provide you with this Annual Water Quality Report, which contains important information about the quality of the drinking water that we deliver to you. It is recommended that you keep this report as a reference source, as it provides useful information, as well as contacts and phone numbers you may need from time to time. If you are a non-English speaking resident, we recommend that you speak with someone who understands it. Call our Public Information Office at 791-4331 for a copy of this report in Spanish.

The format for this report follows the guidelines set by the United States Environmental Protection Agency (USEPA) as part of the Safe Drinking Water Act. The USEPA requires all public water providers to deliver this information to all customers on an annual basis in a single report that provides water quality data to the public in an understandable manner.



DURING 1999, TUCSON WATER ENSURED THAT YOUR DRINKING WATER MET ALL UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA) AND THE STATE DRINKING WATER STANDARDS.

This report contains the following information:

- Where does our drinking water come from?
- What contaminants have been detected in our drinking water?
- Detailed information on detected contaminants.
- Definitions of technical and regulatory terms used in the report.
- Information on expected drinking water contaminants.
- Were there any violations of drinking water regulations?
- How is our drinking water treated?
- Who can I contact for more information?

WHERE DOES OUR DRINKING WATER COME FROM?

In 1999, Tucson Water served about 630,000 people in the Tucson area. The water supply came from approximately 190 groundwater wells located in and around the Tucson metropolitan area (see map). In urban Tucson, most of the wells (also known as Points of Entry or POE) serve the neighborhood in which they are located, with excess supply routed to reservoirs for use elsewhere in the system. Wells located outside the urban core often deliver water to a single "collector" main prior to delivery to customers. In these cases, the collector main is termed a "combined Point of Entry (POE)" to the drinking water system. The Tucson Water system has four combined POEs: the Southern Avra Valley well field, the Santa Cruz well field, the South Side well field, and the Tucson Airport Area Remediation Project (TARP) well field.

WHAT CONTAMINANTS HAVE BEEN DETECTED IN OUR DRINKING WATER?

Tucson Water regularly samples the drinking water that is delivered to you. The water is tested as it enters the system and at hundreds of locations throughout Tucson Water's service area.

The tables on page 3 and 4 list all contaminants that were detected in the required sampling of drinking water delivered to customers by Tucson Water. It is important to remember that the detection of a contaminant in drinking water does not necessarily represent a threat to public health. Current technology allows water utilities to detect extremely low levels of contaminants in drinking water. A detected result means a concentration that is above the minimum value that can be measured by the laboratory. In most cases, the minimum detectable level of a contaminant is well below the USEPA regulatory limit for that contaminant. To compare the detected amount with the amount allowed by the USEPA, refer to the Maximum Contaminant Level (MCL) column in the table.

Because the vast majority of regulated contaminants were not detectable in drinking water delivered by Tucson Water, the non-detected results were not included in this table. For a complete list of all USEPA regulated contaminants contact the USEPA at 1-800-426-4791, or visit the USEPA website at www.epa.gov/ogwdg/wot/appa.html .

INFORMATION ON EXPECTED DRINKING WATER CONTAMINANTS

In 1999, groundwater was the source of all of the drinking water delivered by Tucson Water. All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. As water from rainfall and snowmelt filters through soil to become groundwater, it dissolves naturally-occurring minerals, and in some cases, naturally radioactive materials, and can pick up substances resulting from the presence of organic matter, animals, or from human activity. One would expect to find beneficial minerals such as calcium and magnesium, harmless minerals such as chloride, bicarbonate, and sulfate, and metals such as iron, copper, arsenic, and lead, which may be either beneficial or harmless at low concentrations, but harmful at high concentrations. Groundwater in the Tucson area also contains very small amounts of naturally-occurring organic compounds, which were originally formed by decaying vegetable and animal matter. Finally, groundwater may pick up pollutants from human industrial or domestic activities. For this reason, water utilities must monitor for some 80 man-made organic contaminants.

The following language is required by the USEPA to appear in this report, some of which may not be applicable to deep groundwater wells, the source of the Tucson Water supply:
Contaminants that may be present in a source water can include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage, agricultural livestock, and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.
- Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, USEPA regulations limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water that must provide the same protection for public health. Bottled water may come from either a surface water source or groundwater source, and may be treated minimally or extensively. For information on the quality of your bottled water, contact the water bottling company.

A SPECIAL NOTE TO AT-RISK POPULATIONS

While the Safe Drinking Water Act regulations are intended to protect consumers throughout their lifetime, some people may be more vulnerable to infections from drinking water than the general population. These "at-risk" populations include: immuno-compromised persons such as persons with cancer undergoing chemotherapy, people who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, and in some cases, elderly people and infants. These people should seek advice about drinking water from their health care providers. USEPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the USEPA's Safe Drinking Water hotline.

CONTAMINANTS DETECTED IN REQUIRED DRINKING WATER SAMPLES

Inorganics Contaminant	*Maximum Result*	*Range*	*MCL*	*MCLG*	*Major Sources*
Nitrate (as N)	6.8 ppm	0.34 - 6.8 ppm	10 ppm	10 ppm	Natural deposits; septic tanks; agriculture; sewage.
Radiochemical Contaminant	***Maximum Result***	***Range***	***MCL***	***MCLG***	***Major Sources***
Gross Alpha	5.6 pCi/L	1 - 5.6 pCi/L	15 pCi/L	0 pCi/L	Natural deposits
Radium 226	0.3 pCi/L	0.3 - 0.3 pCi/L	20 pCi/L	NA	Natural deposits

Lead and Copper in Standing Water Samples					
Contaminant	*No. of Samples Above the Action Level*	*90th Percentile Value*	*Action Level*	*MCLG*	*Major Sources*
Lead	one	3.4 ppb	15 ppb	0	Corrosion of household plumbing systems
Copper	none	0.23 ppm	1.3 ppm	1.3 ppm	Corrosion of household plumbing systems

Contaminant	*Annual Average*	*Maximum Result*	*Range*	*MCL*	*MCLG*	*Major Sources*
Trihalomethane - MCL based on an Annual Average						
Chloroform		1.7 ppb	< 0.5 - 1.7 ppb	NA	NA	By-product of chlorination.
Bromodichloromethane		1.5 ppb	< 0.5 - 1.5 ppb	NA	NA	By-product of chlorination.
Bromoform		6.8 ppb	< 0.5 - 6.8 ppb	NA	NA	By-product of chlorination.
Chlorodibromomethane		3.2 ppb	< 0.5 - 3.2 ppb	NA	NA	By-product of chlorination.
Total Trihalomethane	2.5 ppb	12 ppb	< 0.5 - 12 ppb	80 ppb	0 ppb	By-product of chlorination.

DEFINITIONS OF TECHNICAL AND REGULATORY TERMS

Action level. The concentration of a contaminant which, if exceeded, triggers a treatment or other requirement which a water system must follow.

Maximum Contaminant Level (MCL). The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology. If a contaminant is believed to cause health concerns in humans, then the MCL is set as close as practical to zero and at an acceptable level of risk. Generally, the maximum acceptable risk of cancer is 1 in 10,000 with 70 years of exposure.

Maximum Contaminant Level Goal (MCLG). The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

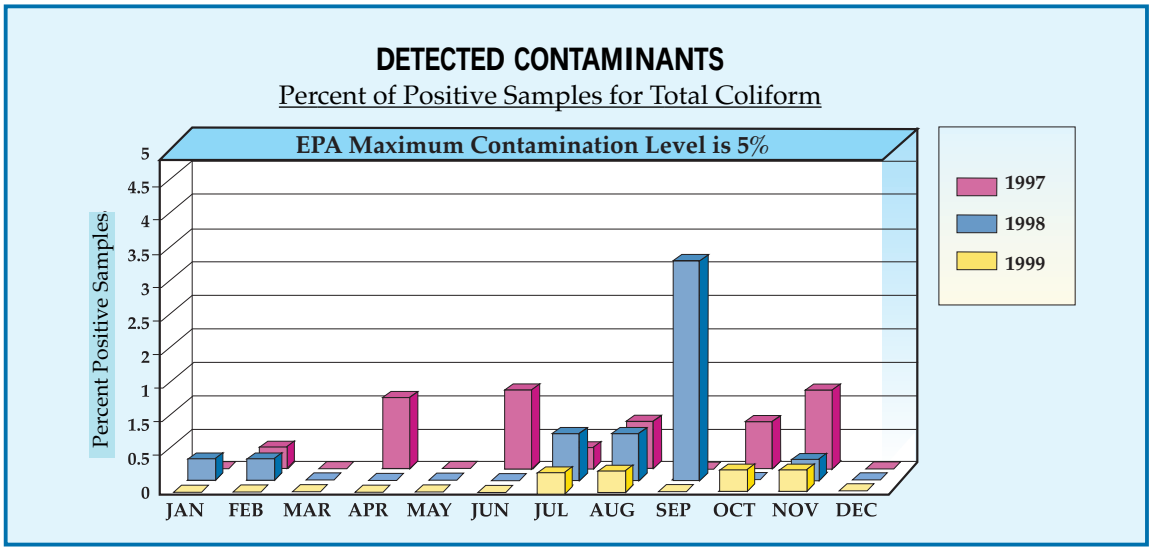
Parts Per Billion (ppb). Some constituents in water are measured in very small units. Organic compounds such as trihalomethanes are monitored by Tucson Water in terms of parts per billion (or micrograms per liter). To help you visualize how very small this unit is, we offer the following illustrations. One part per billion equals: One second of time in 31.7 years or the first 16 inches of a trip to the moon.

Parts Per Million (ppm). Many dissolved minerals such as sodium and calcium are monitored by Tucson Water in terms of parts per million (or milligrams per liter). To help you visualize how very small this unit is, we offer the following illustrations. One part per million equals: 2 ounces of water in a typical 15,000 gallon backyard swimming pool or one second of time in 11.6 days.

Picocurie Per Liter (pCi/L). The quantity of radioactive material in one liter which produces 2.22 nuclear disintegrations per minute.

Point of Entry (POE). All water sources are monitored at the point of entry to the distribution system before the first customer but after any required treatment. For most wells directly feeding the distribution system without treatment, the POE is the well, but in a few cases where the water from a number of wells is collected in a common pipeline before delivery, the POE represents a number of wells in a well field.

Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.



INFORMATION ON CONTAMINANTS DETECTED IN REQUIRED DRINKING WATER SAMPLES

Coliform Monitoring - In order to verify that water delivered to customers meets standards for microbiological contamination, we are required to collect 240 samples per month and test for the presence of coliform bacteria (a very common bacteria found in the environment and in the digestive tract of animals). While it is rarely harmful in itself, the occurrence of coliform bacteria in drinking water is an indicator that the water may also contain harmful microorganisms. The bar chart above gives the percent of positive coliforms found each year for the last three years. The maximum percentage positive allowed in any one month is 5%. In 1999, we had only one sample positive in each of four months: July, August, October, and November.

Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. If you are caring for an infant, you should ask for advice from your health care provider. By monitoring changes in nitrate concentrations in wells over time, and by increasing monitoring frequency as nitrate concentrations rise, Tucson Water provides additional assurance that nitrate values will not exceed safe limits.

Lead and Copper are generally less than 2.5 parts per billion (ppb) and 0.025 parts per million (ppm) respectively in source water. However, these metals can increase when water contacts plumbing materials containing lead pipe, lead soldered copper tubing, or brass valves. Because domestic plumbing is the primary source of these metals, drinking water regulations require testing of the water in contact with plumbing for at least 6 hours. Tucson Water has identified a number of representative homes and businesses and takes samples at inside taps where water has been standing for the required amount of time. Instead of an MCL, the USEPA has set an action level. Ninety percent of the samples collected by Tucson Water were below the 90th percentile value listed in the table. In 1999, only one out of a total of 200 lead samples had a value above the action level. The highest level of lead found in drinking water was 18 ppb and the highest copper was 0.95 ppm.

Under Arizona Department of Environmental Quality regulations, a public water supplier needs to demonstrate that its system has "optimized corrosion control". To demonstrate this, during 1999, Tucson Water conducted more than 100 first draw samples in two consecutive 6-month periods from various residents' taps scattered throughout Tucson. In addition, all the wells/POEs were also sampled for lead and copper in the two consecutive 6-month periods. The results indicated that Tucson Water is in compliance with the regulation and that there is no way to significantly reduce lead uptake in our system.

Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested by a private firm. You can also minimize exposure by using the first water out of your tap in the morning for something other than drinking. The USEPA recommends running the water for 30 seconds to 2 minutes to fully flush domestic plumbing, but Tucson Water has found that in general most of the lead comes from valves and faucets at the point of use. Flushing for only a few seconds will help assure that new valves and faucets do not increase lead in water drawn for drinking.

Gross alpha is a measure of radioactivity due to naturally-occurring minerals in groundwater. The MCL for gross alpha radioactivity is set at 15 picocuries per liter (pCi/L). This excludes the radioactivity contributed by either radon or uranium. The USEPA currently has no standards for uranium.

Radium 226 and 228 are two radioisotopes of radium. The combined amount of both currently cannot exceed an MCL of 5 pCi/l.

Chloroform, Bromodichloromethane, Bromoform, and Chlorodibromomethane are unregulated Volatile Organic Contaminants that make up the contaminant group known as total trihalomethanes. These compounds are frequently detected at very low concentrations in chlorinated groundwater.

Total Trihalomethanes (TTHMs) are formed when chlorine combines with naturally-occurring organic material in water. Since the level of organic matter in our groundwater is extremely low, these compounds are found at very low concentrations.

INFORMATION ON EXTRA SAMPLING

Tucson Water collects significant numbers of samples in addition to those required under drinking water rules. This sampling provides important information for technical understanding of our system and provides our customers additional information on the quality of the water they receive.

Arsenic
The USEPA is reviewing the drinking water standard for arsenic because of special concerns that it may not be stringent enough. Arsenic is a naturally occurring mineral known to cause cancer in humans at high concentration.

In September 99, all of our wells/POEs were sampled for arsenic using improved analytical detection methods. At the time this report went to print, USEPA had not yet published the proposed reduced MCL for arsenic; however, the USEPA is expected to reduce the MCL for arsenic to a concentration between 10 and 3 ppb. Arsenic was detected in fifty-nine wells/POEs. The highest level of arsenic in Tucson Water supplies was 10ppb, less than 20% of the current MCL.
For more information on arsenic, please visit our Website: www.ci.tucson.az.us/water/ .

Volatile Organic Compounds (VOCs) include such compounds as trichloroethylene (TCE) and tetrachloroethylene (PCE). VOCs are volatile like alcohol or gasoline and are made up of relatively small molecules, which allows them to migrate readily through soils. Solvents such as TCE and PCE have been commonly used for cleaning machine parts, and for dry cleaning. These contaminants are often associated with industrial operations and landfills. Despite the vulnerability of groundwater to such contamination, Tucson Water's potable supplies are virtually free of such contamination. No VOCs were detected in the required monitoring for the year except for Total Trihalomethanes (see below). However, Tucson Water collected VOC samples on all POEs (whether or not a sample was required.) In this additional sampling we saw several detects. Additional information on these detects are provided below.

Chloroethane and 1,2-Dichloroethane were both detected in the same well at .6 ppb, just over the .5 ppb detection level. Both are industrial chemicals. Chloroethane is currently largely used as a blowing agent in foamed plastics. Chloroethane is not a regulated contaminant. 1, 2-Dichloroethane has a wide variety of uses.

Ethylbenzene and Xylenes are residual solvents, typically associated with the coatings used to protect new or refurbished water pressure tanks. MCL. These low concentration releases from pressure tank coatings rapidly decrease as the tank ages. One POE had ethylbenzene at 4.1 ppb (the MCL is 700 ppb), and three POEs had total xylenes; 0.027 ppm was the maximum (the MCL is 10 ppm).

Tetrachloroethylene (PCE) was detected in one well. The detected amount was 0.6 ppb.

Trichloroethylene (TCE) was detected in one well. The detected concentration was 0.9 ppb. TCE is the primary contaminant being removed from groundwater in the Tucson Airport Area Remediation Project (TARP).

Radon is a naturally occurring radioactive gas that may cause cancer, and may be found in drinking water and indoor air. While ingesting radon in drinking water has a small lifetime risk, inhaling radon is a primary health concern, particularly for smokers or ex-smokers. Radon percolating up from the soil under homes and buildings is usually the main source of radon in indoor air. Only about 1-2 percent of radon in indoor air comes from drinking water.

If you are concerned about radon in your home, you should test your house and remediate it if you find a level of 4 pCi/l or higher in your indoor air. For more information, call USEPA's Radon Hotline (800-SOS-RADON) or visit the web site www.epa.gov/iaq/radon/.

The USEPA does not currently regulate radon in drinking water. The 1999 USEPA proposed regulation that provides two options for the maximum allowable level of radon in drinking water. The proposed MCL is 300 pCi/L for drinking water or a proposed alternative MCL of 4,000 pCi/L if states or water providers adopt a Multimedia Mitigation (MMM) program. The MMM program is designed to address radon in indoor air. (You can help develop this program for your area. For more information call USEPA's Radon Hotline or visit their web site.)

A comprehensive radon monitoring was performed on the Tucson Water system during 1999. Test results indicate that, when compared with other communities across the country, Tucson has fairly typical concentrations for radon in the water supply. The test results indicated radon concentrations in the wells ranging from about 12 to a maximum of 1430 pCi/L. The median radon concentration in wells was about 250 pCi/L. Because radon gas evaporates, water from the TARP treatment facility is free of radon gas. Please visit our web site at www.ci.tucson.az.us/water/ for more information on radon.

Based on the 1999 radon monitoring results, approximately half of our wells exceed the proposed MCL of 300 pCi/L. These wells will either need to be shut down or expensive treatment technology will need to be acquired. The City is examining the costs and benefits of both direct treatment and the Multimedia Mitigation Program described above.

MONITORING WAIVERS

The Arizona Department of Environmental Quality (ADEQ), the regulatory agency for all public water suppliers in Arizona, grants waivers for certain monitoring requirements during a year. Waivers are granted for specific contaminants if previous monitoring results, and the land uses within a half-mile radius of the well, allows ADEQ to conclude that the risk of contamination by a specific substance is very low.

LATE MONITORING AND REPORTING

At the end of each year Tucson Water conducts an internal audit of compliance monitoring archives to verify that all required monitoring has been completed and reported to the State. The 1999 audit revealed that the department was late on a number of occasions in either the collection of a required sample or in reporting results to the State:

On two occasions, monitoring results were reported to the State after the regulatory deadline. On three occasions, a VOC sample wasn't collected during the required monitoring period. These late samples have now been collected and reported to the State.

One POE was not sampled for radiochemicals during the first two quarters of 1999 as required to complete a series of four consecutive quarterly samples. In order to complete the required four consecutive quarters, sampling was resumed in the fourth quarter of 1999 and will continue through the third quarter of 2000.

During the time interval between the periods that the monitoring was late, water quality cannot be verified because no samples were collected. Therefore, health effects during this period are unknown; however, monitoring both prior and subsequent to the missed time periods have not indicated any MCL violations. VOC's were not detected in any of the late VOC samples or in the previous VOC monitoring. Similarly, the gross alpha results have all been less than 5pCi/L.

WHAT ABOUT CAP WATER?

In 1999, the City of Tucson had rights to approximately 139,000 acre-feet of Colorado River Water per year delivered through the Central Arizona Project (CAP). However, no CAP water was delivered to drinking water customers in 1999. Tucson Water is recharging a portion of the City's available CAP supply by delivering the water to shallow basins and allowing the water to percolate (or recharge) naturally through the earth to reach the groundwater below. The utility is planning to deliver a blend of recharged Colorado River water and groundwater beginning in the year 2001. In 1999, Tucson Water delivered this blend on a very limited scale to selected volunteer neighborhoods in Tucson. Information on the quality of this blend is not contained in this report, but is available on Tucson Water's web site.

HOW IS OUR DRINKING WATER TREATED?

The groundwater delivered by Tucson Water meets all drinking water standards without treatment, with the exception of the water supplied from the Tucson Airport Area Remediation Project (TARP) wells. However, approximately 0.8 parts per million (ppm) of chlorine is added to the drinking water supply at well sites, and approximately 1 ppm is added to reservoirs and other facilities to provide assurance that water delivered to customers will remain free of microbiological contamination. This also ensures that the water meets microbiological drinking water standards from the time it is pumped from the ground until it reaches the customer's tap.

MORE ABOUT TARP

The TARP program was developed in order to clean and make beneficial use of water contaminated with the industrial solvent trichloroethylene (TCE). Tucson Water operates TARP under an agreement with the USEPA and other industrial and governmental agencies, which pay for operation of the TARP program.

Nine wells extract the contaminated water and deliver it through a pipeline to a treatment plant that removes the TCE from the water. The TARP treatment plant uses an "air stripping" process which forces volatile contaminants such as TCE to evaporate from the water into air. The air is then passed through activated carbon filters, which remove the airborne TCE. The TARP plant treats approximately 7.3 million gallons of water per day. During 1999, this plant treated a total of approximately 2.5 billion gallons of water.

This treated water has non-detected levels of TCE. The treated water has been tested on a weekly basis since the start of operations in 1994. The cleaned water is then delivered into the Tucson Water system and is delivered to customers as part of the drinking water supply. This water accounts for approximately 8 % of water served on a daily basis by Tucson Water.

WHO DO I CONTACT FOR MORE INFORMATION?

For more information on this Tucson Water report contact Tom Jefferson with the Water Treatment/Quality Division.
Call 791-5252 or e-mail your questions to tjeffer1@ci.tucson.az.us.

The Water Treatment/Quality Division also publishes an Annual Microbiological Water Quality report detailing the results of monthly distribution system monitoring. Call 791-5252 for more information.

Tucson Water also collects additional water quality data in a program known as "At the Tap." The parameters tested and analyzed under this program include: Hardness, sodium, calcium, magnesium, pH, total dissolved solids, temperature, and free chlorine. The results of the "At the Tap" program are available at the Tucson Water web page and the Water Quality automated phone line.

Finally, Tucson Water conducts quarterly sampling from 30 different points throughout the distribution system (the system is divided into 10 water quality zones with 3 points in each zone). This sampling tests for: pH, chlorine, conductivity, TDS, alkalinity, fluoride, chloride, sulfate, sodium, potassium, calcium, magnesium, silicon, copper, iron, manganese, zinc, and nitrates. The sampling is done to provide Tucson Water and the community with more complete information on "what is in our water."

Customers can provide input into community water policy by providing comments to Tucson's Mayor and Council at regularly scheduled meetings, calling the Mayor and Council comment line at 791-4700, or attending a monthly Citizens' Water Advisory Committee meeting.
Telephone Numbers:

United States Environmental Protection Agency	
Safe Drinking Water Hotline:	1-800-426-4791
Tucson Water Quality Automated phone line	791-4227
Tucson Water Public Information Office	791-4331
Tucson Water Treatment/Quality Division	791-5252
Tucson Water Customer Advocate	791-4556
Tucson Water Customer Service/Billing	791-3242
Tucson Water 24 hour Emergency	791-4133
City of Tucson TTY#	791-2639

Additional information is also available	
from the Tucson Water web site:	www.ci.tucson.az.us/water/
USEPA web site:	www.epa.gov/safewater/

Si usted desea este documento escrito en español, por favor, llame al 791-4331.
The Report Cost: The approximate cost for each of these individual reports was 25 cents

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